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An Epiduroscopy Complication Mimicking a Subarachnoid Haemorrhage: Case Report

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ABSTRACT

Epiduroscopy is an endoscopic technique which permits to explore lumbosacral epidural interspace. It is a useful technique for pharmacological treatment in failed back surgery syndrome, which represents a chronic waist pain. Even if it is a risky procedure, epiduroscopy should be included in the diagnosis and treatment of patients whit post-surgical lower back pain. Several complications can occur during the procedure as infection, meningeal irritation, epidural bleeding. We report a failed procedure with injection in subdural space causing headache, vomiting, seizures, and hyperthermia, mimicking subarachnoid hemorrage in CT scan. The radiological findings and neurological symptoms underwent rapid and spontaneous complete resolution.

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Abbreviations

CT: Computed Tomography
ICU: Intensive Care Unit
SAH: Subarachnoid Hemorrhage

Introduction

Epiduroscopy is a recent diagnostic and therapeutic technique developed for the treatment of low back pain, specifically radicular pain. This technique is adopted when conservative treatment or interventional treatments such as, transforaminal epidural corticosteroid injections or radiofrequency treatment adjacent to the dorsal root ganglion are not very efficacious. It consists of positioning a percutaneous videoguide and an optical fiber into the peridural space reaching the site followed by the mechanical dilatation through a Fogarthy catheter. Adhesions attached to affected nerve roots or the dura can be removed mechanically. This technique appears safe. Nevertheless, it shows complications generally due to dural puncture and fluid injection overpressure [1].

In this study, we report, for the first time, the case of a 77 years old male who underwent epiduroscopy to treat a lumbar stenosis. The accidental subarachnoid infusion of fluid occurred during the procedure and mimicked a subarachnoid hemorrhage (SAH).

Case Report

A 77-year- old male suffering from essential hypertension, underwent epiduroscopy to treat low back pain due to lumbar stenosis. The procedure was performed in prone position, local anesthesia and mild sedation, with the administration of 10 ml of iopamiro into the epidural space. At L2 level a stenosis related to fibrosis and inflammatory tissue was revealed. The three steps of the procedure were adesiolysis, mechanical dilatation through a Fogarthy catheter, and finally flushing with saline solution. During the procedure, hypertension occurred and was treated with diuretic and alpha agonist drugs. After two hours, the patient presented headache, vomiting, seizures, and hyperthermia. Phenobarbital was administered and after four hours respiratory insufficiency appeared. The patient undergone to a brain computed tomography (CT) scan that showed a massive subarachnoid haemorrhage of basal cisterns and of cerebral convexity bilaterally (Figure 1). He was sedated, intubated, and admitted at the ICU of our tertiary care hospital.

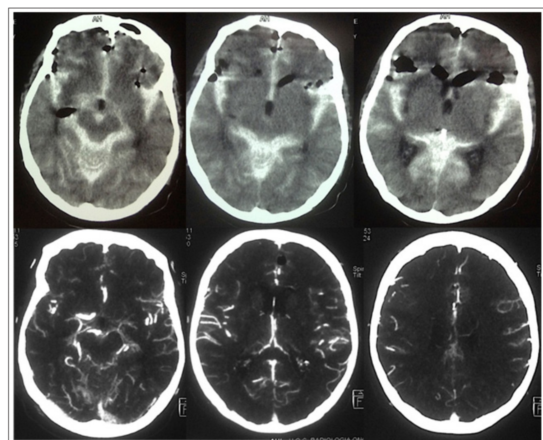

Figure 1: Upper panel: CT scan showing a), b) contrast spreading inside subarachnoid spaces, basal cisterns and c) sylvian fissure. Lower panel: CT scan with angiogram showing the absence of any aneurysms or artero-venous malformations

At the admission, the Glasgow Coma Scale was (1+5+T) and the patient undergone to a new CT scan, which confirmed the presence of SAH. Hemodynamic, respiratory and metabolic parameters were stable. Cardiac markers, troponin and myoglobin were positive and an electrocardiogram showed an elevation of ST tract in V1 and V3 derivations. Signs, symptoms and especially the rapid deterioration of neurological status were indicative of a subarachnoid haemorrhage. Cerebral angiography was negative for aneurysms and arteriovenous malformations. Neuroprotection with hypnotic and oppioid drugs (Propofol 1,5-2,5 mg/proKg/h and Remifentanyl 0,03-0,04 mcg/Kg/min) was administered and maintained in continuous infusion for 12 hours. The head was elevated of 30 degrees and mechanical ventilation (SIMV FiO2 50% during the first 15 hours, then BIPAP until extubating) was applied to guarantee the normocapnia. The day after, a new CT control scan showed the complete resolution of blood within subarachnoid spaces (Figure 2). Sedation was stopped and at a new neurological evaluation patient was orientated, with a finalistic flexion in arms and legs. He was extubated and discharged after 5 days from ICU. No neurological deficits were reported at 5 years follow up.

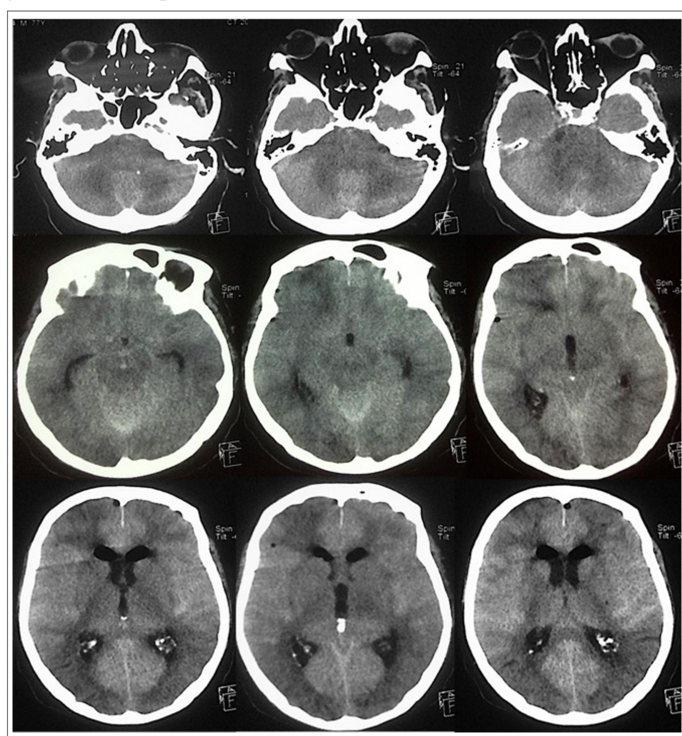

Figure 2: Control CT scan showing complete resolution of mimicking SAH

Discussion

Epiduroscopy is a minimally invasive interventional procedure, recently applied in patients with failed back surgery syndrome and in other cases of low back pain and radiculopathies [1]. Epiduroscopy has the advantage of visually identified structures in the epidural space such as changes in vascularity, fibrosis and adhesions, lateral recess stenosis, disk herniation, and ligamentum flavum hypertrophy. Visualization of the epidural space allows for evaluation of nerve roots and identification of adhesions, inflammation, and other abnormalities. Epiduroscopy offers several advantages: (1) confirmation of the diagnosis of radicular pain; (2) mechanical removal of adhesions; and (3) targeted administration of drugs. As a therapeutic technique, epiduroscopy includes procedures such as direct application of pharmacologic therapy, lysis of scar tissue, adhesions, catheter placement, implantation of stimulation electrodes under direct vision (radio frequency therapy, spinal cord stimulation) and discectomy. Further, epiduroscopy has the potential not only to reduce the incidence of surgery but also to the treatment of post-lumbar surgery syndrome.

Contraindications include coagulopathy, pregnancy, renal insufficiency, chronic liver dysfunction, history of adverse reaction to local anesthetic or antiinflammatory drugs, history of gastrointestinal bleeding or ulcers, urinary sphincter dysfunction, progressive neurologic deficit, infection, increased intracranial pressure, pseudotumor cerebri, intracranial tumors, unstable angina, severe chronic obstructive pulmonary disease, inability to achieve appropriate positioning, and inability to understand informed consent.

Epiduroscopy is performed after antibiotic administration in sterile operative room conditions under conscious sedation with continuous hemodynamic and respiratory monitoring. Using a Seldinger technique, an introducer is advanced over the guidewire into sacral epidural space between S2 and S3, and a baseline epidurogram may be made. Thereupon, the video-guided catheter containing the flexible epiduroscope is inserted. The videoguided catheter with epiduroscope is steered cranially under direct vision in the epidural space to the level of expected pathology in combination with fluoroscopy. To obtain a good visual field, the epidural space is irrigated with saline solution. Pressure in the epidural space can be monitored. Once at the expected level of pathology, gently touching the nerve root with the video-guided catheter should reproduce the patient's pain. Once adhesions are identified, attempts are made to rupture them mechanically by gentle movements of the video-guided catheter and by bolus injections of small amounts of saline solution. In some patients, adhesions are so solid that adhesiolysis is impossible. In these patients and in the absence of inflammation, the procedure is strictly diagnostic. Saline flushing must be suspended immediately if the patient complains of neck pain or headache.

Complications related to epiduroscopy are generally limited and described as minor, caused by puncture trauma, accidental dural injury, puncture of an epidural blood vessel or epidural bleeding, changes in the epidural pressure caused by saline infusion. Headache, cervicodynia, convulsions, dura tear, neurologic damage, infection, general back complaints, vomiting, meningitis, radicular radiating pain, bladder, dizziness, hypoacousia, and rectal disorders are possible events correlated to this procedure [1]. Exceptional events include, acute bilateral visual loss associated with preretinal, retinal and subretinal hemorrhages, encephalopathy and rhabdomyolysis induced by the administration of the contrast agent iotrolan, epidural catheter breakage , allergy due to the opaque agent, pneumocephalus [2-4].

Post-dural puncture headache is reported relatively frequently during epiduroscopy when attempting to carry out placement of the epiduroscopic catheter or from accidental perforation of the dura mater and attributed to a rapid loss of cerebrospinal fluid. Increased epidural pressure can lead to an increased intracranial pressure around the anterior optic nerve, leading to macular hemorrhage and visual disturbances. The current hypothesis states that transient sudden pressure increase in the cerebrospinal fluid can arise from excessively rapid injection of large volumes in the epidural space [5]. This implies that the inflow of saline during epiduroscopy should be carried out slowly and in small volumes.

As far as we know, this complication is reported for the first time. In our patient, the CT scan showed a picture as SAH, which resolved, then, spontaneously. It is likely that the excess and, perhaps, the rapid introduction of contrast medium has reached the subarachnoid spaces, simulating, in this way, a SAH.

Conclusions

Epiduroscopy allows a direct endoscopic imaging of the epidural space commonly adopted in patients with low back pain, radiculopathy, and with a post-lumbar surgery syndrome. Despite the reported complications, this technique is safe and simply to apply. However, the knowledge of complications and accidental symptoms, using proper epiduroscopic equipment can help prevention from accidents.

Conflict of Interest Statement

The authors report no conflicts of interest with respect to the materials or methods used in this study or the results specified in this document.

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